

An Analysis of the Mathematics Book for the First Intermediate Grade According to the Dimensions of Mathematical Power

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Abstract

The current research aims to analyze the mathematics book for the first intermediate grade according to the dimensions of mathematical power by answering the following question:

What is the percentage of the availability of the dimensions of mathematical power included in the content of the mathematics textbook for first-grade students, average, in its first, and second parts for the academic year 2020-2021, approved by the Iraqi Ministry of Education / General Directorate of Curricula?

The research community was determined by middle school mathematics books, and middle school students for middle ,and high school day schools affiliated to the Directorate of Education in Dhi Qar, and by the intentional test, the research sample was selected for the book of the first intermediate grade in its part, and the students of the research sample are first grade students in the schools of education in Dhi Qar.

The researcher adopted the analytical descriptive research method, where two research tools were built.

Analysis tool: a content analysis card (prepared by the researcher) for the purpose of using it in the analysis. It includes (104) of the sub-criteria (indicators) distributed over (37) of the main criteria distributed over (11) the field of these areas representing the three dimensions of mathematical power. The mathematics book was analyzed For the first intermediate grade, with its first and second parts The results of the analysis were (16,780) distributed on the three dimensions of mathematical power, as the first dimension (mathematical knowledge) obtained the number of repetitions (5072) repetitions and in a percentage of (30%), and the second dimension (mathematical operations) obtained the number of repetitions (6293) recurrences and By a percentage (38%), and the third dimension after (sports content) got the number of repetitions (5415) repetitions and by a percentage (32%). The validity of the analysis was confirmed by presenting a sample of the analysis to a number of arbitrators and specialists in the methods of teaching mathematics. They agreed on the validity of the analysis process. The stability of the analysis was calculated by agreement between external analysts and with the researcher and himself after a period of time using the Holsty equation.

The results were (including the mathematics book the two parts, not the mathematical power dimensions).

The researcher reached conclusions, including the interest of the mathematics book, the first and second parts of the first grade, in the dimensions of mathematical power, and its achievement in all dimensions, which indicates the importance of mathematical power. According to the results, he reached recommendations, including: - Rebuilding the curricula for all educational levels in the Ministry of Education according to the

dimensions of sports strength, taking into account the balance in the percentages of those dimensions. A number of proposals were made, including: -

1- Analyzing mathematics books for other stages according to the dimensions of mathematical power.

2- Conducting studies to show the obstacles that affect the development of the student's athletic strength.

Chapter one

First: The problem of the research

Despite the diversity of the curricula and its development, it suffers from defects, problems, errors and poor presentation of mathematical topics that seem clear in many cases. Therefore, quick and decisive steps must be taken in order to rebuild and evaluate textbooks, which are the only source for the student. (Abu Zina, p. 92, 2003).

The researcher noted that it is very necessary to study the extent to which the content of mathematics books is included, in the dimensions of mathematical power, and this is positively reflected on the student's behavior through his acquisition of all the skills and components of mathematical strength that he learns from mathematics textbooks. After reviewing the mathematics books, the researcher found the interest of curriculum experts in the procedural aspect through its abundance questions that modern mathematics books have especially in the advanced age stages in order to convert mathematics to the practical side and leave it from the theoretical side for the purpose of memorizing and consolidating the material. considered to be forgotten, and from the researcher's knowledge of some studies that dealt with one field or a simple number of criteria, and these are not sufficient to be an approved study in scientific research, and because there are no studies that dealt with all dimensions of mathematical power (according to the researcher's knowledge), since the first intermediate grade.

It is the basic building block upon which learning the basic principles of mathematics is built. The researcher felt the need to get acquainted with the content of the mathematics book for the first intermediate grade and from his question to teachers and supervisors about mathematical power and their lack of knowledge of it, and through the researcher's experience in the field of training courses and his work in the preparation and training department of the Directorate Public education in Dhi Qar for 16 years It was noticed that the supervisors and training leaders did not know the mathematical power and that no training course was held to know the inclusion of the mathematical power of the methodological books and its development in the teacher. The researcher deliberately analyzed the mathematics book for the first grade average according to the dimensions of the mathematical power. Therefore, the research problem is determined by answering the following question:

To what extent does the mathematics book for the first intermediate grade include the dimensions of mathematical power?

Second, the importance of the research

The importance of mathematical power is highlighted as the criterion that defines the characteristics of the mathematical product and is considered one of the entrances to the evaluation and development of school mathematics. Mathematical power means the student's representation of mathematical experience and knowledge in its fields (conceptual, procedural and problematic). This is to communicate in the language of

mathematics and the interrelationship between the contents of experience and reasoning in order to think and reflect in a diverse environment and solve unfamiliar problems in a non-routine way. (Al-Saeed, p. 201, 2018).

Given the importance of the intermediate stage in Iraq, as it is a complementary stage to the primary stage in building the student, deepening his experiences, and refining his various skills by revealing his abilities and talents and preparing him for secondary stages or joining the fields of work and production. The growing scientific stage, which is a stage in which all the measures taken by the prescribed curricula are reflected, including the content of the scientific subject, for the purpose of preparing the student to be an effective individual in his society.

Third: Research Objectives: The research objective is to answer the following question (What is the percentage of the availability of mathematical power in its three dimensions (mathematical knowledge, mathematical operations, mathematical content) in the mathematics book scheduled for first-grade intermediate students in the first and second parts, which was approved by the Ministry of Education in the Republic of Iraq for the academic year 2020-2021 AD).

Fourth: The limitations of the research

Mathematics book for students of the first intermediate grade in the first and second parts for the academic year 2020-2021 AD by its author (Amir Abdul Majeed Jassem, and others) for the year 2019, 4th edition.

Fifth: Defining terms

First: Mathematical power: It has several definitions, including:

"It is the maximum amount of mathematical knowledge that students can use to think and communicate mathematically and in life. It is knowledge and post-mathematics knowledge of students' abilities to infer and think creatively and critically. In addition to the ability to formulate and solve unfamiliar problems. The basic criterion for learning mathematics for every student is the strength of mathematics, which means the student's ability to discover, interconnect, and logical and mathematical reasoning, in addition to using mathematical knowledge and methods effectively to solve unfamiliar mathematical problems" (Al-Saeed, p. 202, 2018).

Second: content analysis

A- Disclosing information and accurate interpretation of the concepts contained in the text, hadith or images, and expressing them clearly, objectively, comprehensively and with utmost accuracy. (Al-Habali, p. 54, 1989).

Chapter Two

Theoretical Background

First: Theoretical Background: This chapter includes a theoretical background for the current study, as it deals with an overview of the concept of mathematical power and its dimensions, and also includes the most important of previous studies.

First: Mathematical power

1. Mathematical power concept

The National Committee for Teachers of Mathematics in the United States of America (NCTM) defined the fourth standard for mathematical evaluation, which is the

knowledge and post-knowledge of the student's ability to reason and think creatively and critically, in addition to the student's ability to formulate and solve non-routine problems. (NCTM, p. 205-208, 1989).

2- The dimensions of the Mathematical strength: It consists of three main dimensions:

First dimension/ Mathematical knowledge (the cognitive component): It consists of three areas: knowledge (conceptual, procedural, and problem solving).

Second dimension/ Mathematical operations: It consists of three areas: (communication, interconnection, mathematical inference).

Third dimension / mathematical content: It consists of five areas: (Al-Saeed, 2018: 202)

Content Analysis

An Analysis is the dismantling of a thing into its components, components and combinations, and then we find the relationship between these parts and the analysis of school curricula. This means dismantling the curriculum into its foundations, components and methodological components, that is, the opposite of the process of preparing the curriculum, that is, it is a work with the intention of investigating the thing. (Zaytoun, p. 548, 2010).

School book

School book concept

The textbook represents the main pillar in the educational process, as it transforms curricula into images. The student interacts with the educational experiences included in the textbook with the help of the teacher in terms of direction and guidance. The textbook includes the skills and values that the student must learn in an orderly and organized manner (Sundorg, p. 204, 2014).

Chapter Three

The Procedures of the Study

This chapter includes a detailed presentation of the procedures adopted by the researcher in achieving the objectives of his study in terms of study methodology, population identification, sample identification, steps for preparing study tools and procedures for applying them to the sample, as well as defining statistical means as follows:

First: The methodology of the study: In this study, the researcher adopted the descriptive analytical research method, because it is the appropriate diagnosis of a phenomenon and quantitatively studied it with linguistic and mathematical symbols, and the method is not limited to the limits of Describe the phenomenon that is the subject of the study, but it goes beyond that to analyze, interpret and compare the results to reach generalizations. (Abdul Rahman & Adnan, p. 191, 2006).

Second: The community of the study: It consists of the study material community and includes middle school mathematics books in Iraq.

Third: The sample of the study: The current study sample includes a sample of the mathematics book for the first intermediate class

Fourth: Study tools:

- 1- A card for analyzing the content of the mathematics book for the first intermediate grade (prepared by the researcher).
- 2- Preparing a list of the dimensions of mathematical power and its domains included in the content of the mathematics curriculum for the first intermediate grade.
- 3- Unloading the results from the analysis card, classifying them and converting them into repetitions and then into percentages that can be processed statistically.

Validity of the analysis: is intended to achieve the analysis tool for the purpose for which it was prepared, that is, it measures what it was designed to measure and does not measure other things, as well as depends on the extent to which the measurement items represent a proper representation of the measured field. (Aga, p. 60, 1997).

To ensure the validity of the mathematics curriculum content analysis tool, the researcher presented part of the material analysis, which is the first chapter, to a group of experts and specialists in mathematics teaching methods and curricula to express their opinions on the validity of the analysis card.

The validity of the main analysis criteria and sub-criteria (indicators) and after examining each field of analysis and the criteria it contains and the suitability of each paragraph to the appropriate field to which it belongs. %) or more for the survival and validity of the main criteria and sub-criteria (indicators), (Samara and others) consider that the paragraph is considered valid for use if it obtains the percentage of experts' agreement (80%) and more. This is evidence of the truthfulness of the tool (Samara & others, p. 120, 1989).

The stability of the analysis tool: It is intended to give the analysis tool almost the same results if it is re-applied again on the same individuals and under the same circumstances. (Al-Imam & others, p. 145, 1990).

To confirm this, the researcher took the following steps:

1- Calculating stability across others

The researcher calculated the reliability coefficient for the others between the analysis of the researcher and the first analyst* using the (Holsty) equation.

Table (1) The stability coefficient between the researcher and the first analyzer of the mathematical power included in the mathematics book for the first grade average in its first and second parts

Analysis	Chapter One	Chapter Two	Chapter Three	Chapter Four	Chapter Five	Chapter Six	Chapter Seven	Total
researcher	2669	2710	2760	2677	2066	1919	1979	16780
The first analyst	2156	2301	2290	2271	1704	1688	1623	14034
agreement points	2156	2301	2290	2271	1704	1688	1623	14034
points of difference	513	409	470	406	362	231	355	2746
stability coefficient	89%	92%	91%	92%	90%	94%	90%	91%

2- Calculation of stability over time: the researcher re-analyzed the content of the mathematics book for the first grade average in its first and second parts after a period of (21) days from the first analysis, and by calculating the stability coefficient according to the (Holstey) equation, it was found that the percentage of the reliability coefficient is (87%) and the table (2) Explains the process of analysis carried out by the researcher over time.

Table (10) The stability coefficient over time for the mathematical power included in the mathematics book for the first grade, average, in its first and second parts

Analysis	Chapter One	Chapter Two	Chapter Three	Chapter Four	Chapter Five	Chapter Six	Chapter Seven	Total
first	2669	2710	2760	2677	2066	1919	1979	16780
second	1894	1954	1972	2071	1807	1567	1670	12935
agreement points	1894	1954	1972	2071	1807	1567	1670	12935
points of difference	775	756	788	606	259	352	309	3845
stability coefficient	83%	84%	83%	87%	93%	90%	92%	87%

Dr. Zainab Abdel-Sada Awwad / Methods of Teaching Mathematics / University of Dhi Qar / College of Education We note from the results of Tables (1), (2) that the reliability coefficients between the researcher and the first analyst and between the researcher and himself over time are high, which indicates the stability of the analysis and makes this for the researcher to be reassured to use this tool in the analysis if the references confirm the acceptable agreement ratio is (70%) or more. (Sheikh, p. 44, 2009).

Sixth: Statistical Means

1- The researcher used the following mathematical methods to process the data of the current study

A- Percentages, frequencies of arithmetic means.

B- Holsti equation to find the stability coefficients of content analysis according to the dimensions of mathematical power.

Chapter four

The presentation and interpretation of the results

1- Presenting the results of content analysis in the light of the dimensions of mathematical power and their interpretation. For the purpose of achieving this part of the study, the results of content analysis will be presented according to the three dimensions of mathematical power.

Table (3) Frequencies and percentages of the dimensions of mathematical power in all chapters of the mathematics book for the first grade, the average of the first part and the second part

Chapter	Mathematical Knowledge	Percentage	Mathematical Operations	Percentage	Mathematical Content	Percentage
first	858	17%	1128	18%	683	13%
second	858	17%	1157	18%	695	13%
third	797	16%	1017	16%	946	17%
fourth	870	17%	925	15%	882	16%
Fifth	600	12%	789	13%	677	13%
sixth	522	10%	573	9%	824	15%
seventh	567	11%	704	11%	708	13%
Total	5072	100%	6293	100%	5415	100%

2- The presentation of the results of the mathematical power included in the mathematics book for the first intermediate grade in its first and second parts for the academic year 2020-2021 AD according to the following table:

Table (4) Frequencies, percentages, and arrangement of the dimensions of mathematical power included in the mathematics book for the first grade average in its first and second parts

Dimension sort	Frequencies	percentages	arrangement
Mathematical knowledge	5072	30%	third place
Mathematical operations	6293	38%	First place
Mathematical Content	5415	32%	Second place
Total	16780	100%	100%

The presentation and interpretation of the results

From Table (4), we note that (Mathematics Operations) ranked first with a percentage (38%) with a number of iterations (6293), which indicates the keenness of curriculum experts to enable first-grade intermediate students from the three fields of operations, namely (the field of communication and interdependence and Mathematical inference).

Each field has been previously exposed It comes in second place after (mathematics content) with a percentage (32%) and a number of recurrences (5415). Curriculum experts emphasized that the vocabulary of the mathematics curriculum for

the first grade is averaged on all five areas of mathematical content, which are (the field of numbers, operations, numerical sense, measurement, engineering and sense). spatial, algebra and algebraic patterns, data collection and organization, statistics and probability).

Finally, mathematical knowledge came in third place with a percentage (30%) and a number of repetitions (5072), which indicates the keenness of curriculum experts to apply the three areas of mathematical knowledge, which are (the field of conceptual and procedural knowledge and knowledge of problem solving) taking into account the age stage of first-grade intermediate students. Which indicates that the mathematics book for the first intermediate grade included the dimensions of mathematical power).

Second: conclusions

1- The interest of the mathematics book for the first grade average in its first and second parts in the dimensions of mathematical power and the book's investigation of all dimensions of mathematical power, which indicates the extent of the importance of mathematical power

2- The content of the mathematics curriculum for first-grade intermediate students for the academic year (2020-2021) contains the dimensions of mathematical power, but in a varying manner, ranging from good ratios such as the dimension (mathematical operations) to weak ratios such as the dimension (mathematical knowledge) and also included the percentage disparity Within each of the domains subordinate to each dimension of athletic power.

Third: Recommendations: In light of the findings of the study, the researcher suggests a number of recommendations to those concerned, curricula experts and those responsible for preparing and planning curricula, as well as supervisors of jurisdiction teachers take this recommendation

1- Reconsidering the content of the mathematics curriculum for the first intermediate grade in Iraq so that the topics available in the curriculum are addressed according to the balance in the dimensions of mathematical power for the purpose of reaching the quality of education and keeping pace with the knowledge explosion.

2- Reconstructing the curricula in the Ministry of Education for mathematics for all academic levels according to the dimensions of mathematical power, taking into account the balance in the percentages of all indicators of the domains affiliated to each of the dimensions of mathematical power.

3- Using the list of criteria for the dimensions of mathematical power adopted by the researcher in this study in developing the mathematics book for the first intermediate grade.

Fourth: Suggestions: The researcher proposes some suggestions in the light of the current study.

1- Conducting a similar study on another stage of study according to the dimensions of athletic power

2- Conducting a comparative study between the content of systematic mathematics books in Iraq with the content of mathematics books in another country for the same academic level according to the dimensions of mathematical strength.

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